Amendments to the Specification:

The paragraph starting at page 1, line 9, is amended and now reads as follows:

-- The invention relates to a coordinate measuring apparatus for measuring workpieces. The apparatus has at least one probe pin which can be attached to a probe head moveable in the coordinate directions. The probe pin or the probe pins have shafts at whose respective ends contact bodies are attached and at least two of these shafts have different orientations when attached to the probe head in accordance with the application. The apparatus also includes a control and evaluation unit for controlling the measuring sequence and for evaluating the measuring points recorded. --

The paragraph starting at page 9, line 25, is amended and now reads as follows:

-- FIG. 1 shows ~~by way of example~~ a coordinate measuring apparatus of the so-called portal type according to the invention. The coordinate measuring apparatus includes a probe pin 6 which is attached to a probe head 5 so that it can be exchanged. The probe pin 6 can be deflected in the three coordinate directions (x, y, z) relative to the probe head 5. The deflection of the probe pin 6 in the three coordinate directions (x, y, z) is detected by three measuring sensors disposed in the probe head 5. The probe head, in turn, can be moved in the three coordinate directions (x, y, z). For this purpose, the portal mechanism includes a portal 2 which can be moved on guides in the direction indicated by the arrow (y)

relative to the measuring table 1. The so-called X-carriage 3 is, in turn, moved in the direction indicated by the arrow (x) along the traverse of the portal 2 spanning the measuring table. The spindle 4 is movably guided in the direction (z) on the X-carriage 3 so that the probe head 5 can be moved via the portal mechanism in the three coordinate directions (x, y, z). The measurement of a workpiece takes place in that the probe pin 6 contact scans or samples the workpiece 7, which is to be measured, at the provided measuring points. In the probe head 5, the deflection of the probe pin 6 relative to the probe head 5 is measured in the three coordinate directions (x, y, z). In addition, the actual or current position of the probe head 5 is measured in the three coordinate directions (x, y, z) on the three incremental scales (8a to 8c) which are scanned by optical read-out heads. For determining a measuring point, the scale measurement values (8a to 8c) are computed with the probe pin deflections, which are determined by the measuring sensors in the probe head 5, and a measuring point is generated therefrom. --

The paragraph starting at page 12, line 17, is amended and now reads as follows:

-- FIG. 3 shows a schematic of the probe ~~pin~~ shaft 14e and the probe ball 13e of the probe pin 12 of FIG. 2 attached thereto. Furthermore, a longitudinal axis a_{14e} is assigned to the probe shaft 14e which, by way of example, runs through the center point of the probe ball 13e and through the center point of the profile of the probe shaft. Also shown in FIG. 3 is that a vector $\vec{s}_{14e}$ is assigned to the probe shaft 14e and this vector is aligned in the direction of the longitudinal axis a_{14e}. The foot point of the vector $\vec{s}_{14e}$ is directed in the direction of the suspension of the

probe shaft 14e on the probe pin and its tip is in the direction of the contact body 13e. The vector $\vec{s}_{14e}$ could also be defined rotated by 180° in case this is wanted. In this case, the foot point of the vector $\vec{s}_{14e}$ is in the direction of the contact body 13e while the tip of the vector is pointed in the direction of the suspension of the probe shaft 14e. --

The paragraph starting at page 14, line 20, is amended and now reads as follows:

-- The angle β_{ij} between the vectors ($\vec{n}_{Ai}$ or $\vec{n}_{Ii}$) of a geometric element and the vector $\vec{s}_j$ of a probe shaft can be computed very simply via vector multiplication. The computation of a suitable probe shaft for outer elements as well as also for inner elements takes place in the same way. For this reason, the terminus $\vec{n}_i$ is used for simplification for $\vec{n}_{Ai}$ as well as for $\vec{n}_{Ii}$. If one determines a unit vector (that is, $|\vec{s}_j|=1$ and $|\vec{n}_i|=1$ from the vector $\vec{n}_i$ of a geometric element as well as from the vector $\vec{s}_j$ of the probe ~~pin,~~ shaft, then the following relationship applies:

Equation 1: $\vec{s}_j\ \vec{n}_i = |\vec{s}_j||\vec{n}_i|\cos(\beta_{ij})$ --

The paragraph starting at page 19, line 28, is amended and now reads as follows:

-- It is also mentioned that the invention is not limited to the embodiments of FIGS. 1 to 11. Rather, numerous changes can be made. For example, the coordinate measuring apparatus need not be a portable measuring apparatus as shown in FIG. 1. Instead, a stand measuring device, bridge measuring device or a robot arm having rotational joints can be used for moving the probe head 5 in the coordinate directions. Also, the probe

elements 13a through 13e need not be probe balls but can, for example, be cylinders or tips. Furthermore, the probe head need not perforce be a measuring probe head whose probe pin can be deflected in three coordinate directions relative to the probe head. It can, for example, also be a switching probe head via which a signal is generated with a contact of the probe pin on the workpiece and ~~lead~~ leads to a read-out of the measuring scale values. The probe pin need also not be exchangeable on the probe head. In the invention, a single probe pin, which cannot be exchanged and has several different probe shafts, can be fixed, for example, with a screw on the probe head 5. --